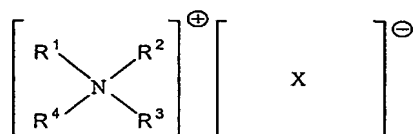


**What is claimed is:**

- 1                    1.        A polymer-cellulosic fiber composition comprising from about 30 to  
2        about 70 wt. % polymer, from about 70 to about 30 wt. % cellulosic fiber, and from  
3        about 1 to about 7 phc of a quaternary ammonium alkyl salt having the formula:



- 4  
5        wherein X is an alkyl carboxylate -O-C(O)R, alkyl sulfate -OS(O)<sub>2</sub>OR, alkyl  
6        sulphonate  
7        -S(O<sub>2</sub>)OR, alkyl phosphate -OP(O)OHOR, alkyl phosphite -OP(O)H-OR; R is an  
8        alkyl group having from 8 to 22 carbon atoms, and R<sup>1</sup> is a long chain alkyl group or  
9        a benzyl group and,

- 10                    where the R<sup>1</sup> group is a long chain alkyl group, R<sup>2</sup> and R<sup>3</sup> are short chain  
11        alkyl groups and R<sup>4</sup> is a short or long chain alkyl group and,

- 12                    where R<sup>1</sup> is a benzyl group, R<sup>2</sup> is a short chain alkyl group and R<sup>3</sup> and R<sup>4</sup>  
13        are each either short or long chain alkyl groups;  
14        said long chain alkyl groups having from 8 to 22 carbon atoms and said short chain  
15        alkyl groups have from 1 to 4 carbon atoms.

- 1                    2.        The polymer-cellulosic fiber composition of claim 1, wherein the  
2        long chain alkyl group has from 8 to 22 carbon atoms and the short chain alkyl  
3        group has from 1 to 4 carbon atoms.

1           3.     The polymer-cellulosic fiber composition of claim 1 wherein the  
2     quaternary ammonium alkyl salt is an alkyldimethylbenzyl ammonium lauryl, an  
3     alkyl trimethyl ammonium lauryl or a dialkyl dimethyl ammonium lauryl salt, or a  
4     combination thereof.

1           4.     The polymer-cellulosic fiber composition of claim 1, wherein the R  
2     group contains from 10 to 18 carbon atoms.

1           5.     The polymer-cellulosic fiber composition of claim 3, wherein the  
2     alkyldimethylbenzyl ammonium alkyl salt is alkyldimethylbenzyl ammonium lauryl  
3     sulfate.

1           6.     The polymer-cellulosic fiber composition of claim 5, wherein the  
2     alkyl group in the alkyldimethylbenzyl ammonium lauryl sulfate contains 40% C<sub>12</sub>,  
3     50% C<sub>14</sub> and 10% C<sub>16</sub>.

1           7.     The polymer-cellulosic fiber composition of claim 3, wherein the  
2     quaternary ammonium alkyl salt is didecyldimethyl ammonium lauryl sulfate.

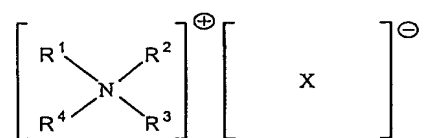
1           8.     The polymer-cellulosic fiber composition of claim 1, wherein the  
2     polymer is a high-density polyethylene.

1           9.     The polymer-cellulosic composition of claim 1, wherein the cellulosic  
2     fiber is oak, pine, or maple, straw, corn stalks, rice hulls, wheat, oat, barley, oat  
3     chaff, coconut shells, peanut shells, walnut shells, jute, hemp, bagasse, bamboo,  
4     flax, kenaf, or a combination thereof.

1           10.    The polymer-cellulosic composition of claim 1, further comprising  
2     about 0.001 to about 3.0 wt. %, based on weight of wood, of a biocide.

1            11.    The polymer-cellulosic composition of claim 10, wherein the biocide  
2            is a copper compound, a zinc compound, an azole, an isothiazolone, a carbamate, or  
3            a combination thereof.

1            12.    An extrudable composition comprising from about 30 to about 70  
2            wt. % polymer, from about 70 to about 30 wt. % cellulosic fiber and from about 1 to  
3            about 7 phc of a quaternary ammonium alkyl salt having the formula:



4  
5            wherein X is an alkyl carboxylate -O-C(O)R, alkyl sulfate -OS(O)<sub>2</sub>OR, alkyl  
6            sulphonate  
7            -S(O<sub>2</sub>)OR, alkyl phosphate -OP(O)OHOR, alkyl phosphite -OP(O)H-OR; R is an  
8            alkyl group having from 8 to 22 carbon atoms, and R<sup>1</sup> is a long chain alkyl group or  
9            a benzyl group and,

10            where the R<sup>1</sup> group is a long chain alkyl group, R<sup>2</sup> and R<sup>3</sup> are short chain  
11            alkyl groups and R<sup>4</sup> is a short or long chain alkyl group and,

12            where R<sup>1</sup> is a benzyl group, R<sup>2</sup> is a short chain alkyl group and R<sup>3</sup> and R<sup>4</sup>  
13            are each either short or long chain alkyl groups;

14            said long chain alkyl groups having from 8 to 22 carbon atoms and said short chain  
15            alkyl groups have from 1 to 4 carbon atoms.

1            13.    The extrudable composition of claim 12, wherein the long chain alkyl  
2            group has from 8 to 22 carbon atoms and the short chain alkyl group has from 1 to  
3            4 carbon atoms.

1           14.    The extrudable composition of claim 12 wherein the quaternary  
2    ammonium alkyl salt is an alkyldimethylbenzyl ammonium lauryl, an alkyl trimethyl  
3    ammonium lauryl or a dialkyl dimethyl ammonium lauryl salt, or a combination  
4    thereof.

1           15.    The extrudable composition of claim 14, wherein the R group  
2    contains from 10 to 18 carbon atoms.

1           16.    The extrudable composition of claim 14, wherein the  
2    alkyldimethylbenzyl ammonium alkyl salt is alkyldimethylbenzyl ammonium lauryl  
3    sulfate.

1           17.    The extrudable composition of claim 16, wherein the alkyl group in  
2    the alkyldimethylbenzyl ammonium lauryl sulfate contains 40% C<sub>12</sub>, 50% C<sub>14</sub> and  
3    10% C<sub>16</sub> alkyl.

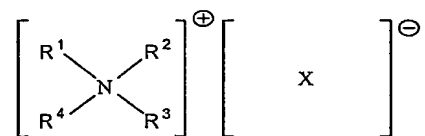
1           18.    The extrudable composition of claim 14, wherein the quaternary  
2    ammonium alkyl salt is didecyldimethyl ammonium lauryl sulfate.

1           19.    The extrudable composition of claim 12, wherein the polymer is a  
2    high-density polyethylene.

1           20.    The extrudable composition of claim 12, wherein the cellulosic fiber  
2    is oak, pine, or maple, straw, corn stalks, rice hulls, wheat, oat, barley, oat chaff,  
3    coconut shells, peanut shells, walnut shells, jute, hemp, bagasse, bamboo, flax,  
4    kenaf, or a combination thereof.

1           21.    A method of preventing decay of a polymer-wood composite  
2    comprising mixing a quaternary ammonium alkyl salt into an extrudable  
3    composition containing a polymer and cellulosic fibers before performing an

4 extrusion process on the extrudable composition, wherein the quaternary ammonium  
5 alkyl salt has the following formula:



6  
7 wherein X is an alkyl carboxylate -O-C(O)R, alkyl sulfate -OS(O)<sub>2</sub>OR, alkyl  
8 sulphonate  
9 -S(O<sub>2</sub>)OR, alkyl phosphate -OP(O)OHOR, alkyl phosphite -OP(O)H-OR; R is an  
10 alkyl group having from 8 to 22 carbon atoms, and R<sup>1</sup> is a long chain alkyl group or  
11 a benzyl group and,

12 where the R<sup>1</sup> group is a long chain alkyl group, R<sup>2</sup> and R<sup>3</sup> are short chain  
13 alkyl groups and R<sup>4</sup> is a short or long chain alkyl group and,

14 where R<sup>1</sup> is a benzyl group, R<sup>2</sup> is a short chain alkyl group and R<sup>3</sup> and R<sup>4</sup>  
15 are each either short or long chain alkyl groups;

16 said long chain alkyl groups having from 8 to 22 carbon atoms and said short chain  
17 alkyl groups have from 1 to 4 carbon atoms.

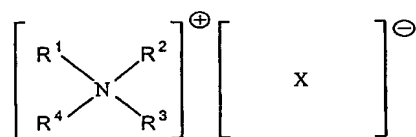
1 22. The method of claim 21 wherein the quaternary ammonium alkyl salt  
2 is an alkyldimethylbenzyl ammonium lauryl, an alkyl trimethyl ammonium lauryl or  
3 a dialkyl dimethyl ammonium lauryl salt, or a combination thereof.

1 23. The method of claim 22, wherein the alkyldimethylbenzyl ammonium  
2 alkyl salt is alkyldimethylbenzyl ammonium lauryl sulfate.

1 24. The method of claim 22, wherein the quaternary ammonium alkyl salt  
2 is didecyldimethyl ammonium lauryl sulfate.

1           25.    The method of claim 21, wherein the polymer-wood composite  
2           contains 30 to 70 wt. % of polymer, 70 to 30 wt. % of cellulosic fiber, and from 1 to  
3           7 phr of the quaternary ammonium alkyl salt

1           26.    A quaternary ammonium alkyl salt having the formula:



2  
3           wherein X is an alkyl sulphonate -S(O<sub>2</sub>)OR, an alkyl phosphate -OP(O)OHOR, or  
4           an alkyl phosphite -OP(O)H-OR; R is an alkyl group having from 8 to 22 carbon  
5           atoms, and R<sup>1</sup> is a long chain alkyl group or a benzyl group and,

6           where the R<sup>1</sup> group is a long chain alkyl group, R<sup>2</sup> and R<sup>3</sup> are short chain  
7           alkyl groups and R<sup>4</sup> is a short or long chain alkyl group and,

8           where R<sup>1</sup> is a benzyl group, R<sup>2</sup> is a short chain alkyl group and R<sup>3</sup> and R<sup>4</sup>  
9           are each either short or long chain alkyl groups.